USERS MANUAL

Tron S-VDR CAPSULE

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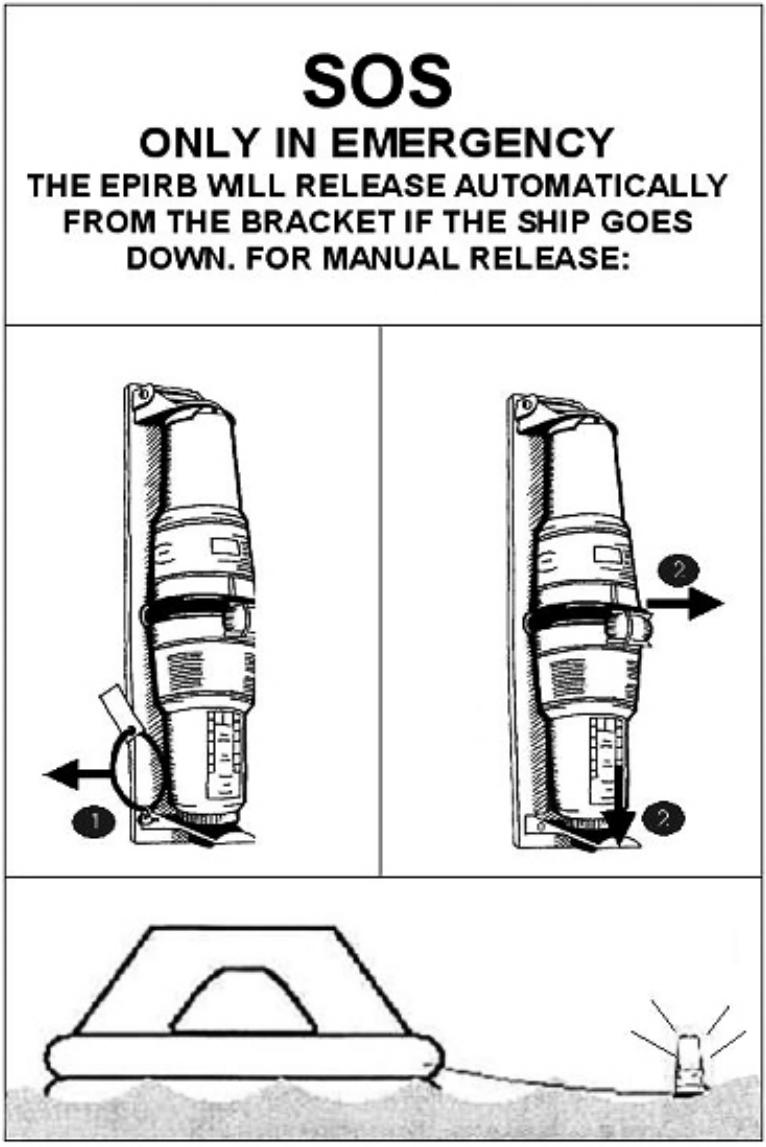

Amendment Records

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8	TH	11.06.09	All pages	H	Layout changes
9					
10					
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IMPORTANT

TO PERMANENTLY DISABLE EPIRB

The battery module must be removed and treated according to chapter 5.6.2 in this manual.

WARNING

USE ONLY THIS EPIRB DURING SITUATIONS OF GRAVE AND IMMINENT DANGER

FALSE ALERTS

De-alerting sar forces in event of inadvertent activation, or assistance no longer required

False alarms divert rescue forces from real distress situations. Intentional false alerts may result in penalties.

Responding to false alarms costs millions annually.

WE NEED YOUR HELP:

1. Remember: activating your beacon is the equivalent of transmitting a mayday.
2. Follow manufacturer procedures when testing your beacon.
3. If your beacon is activated
    - In a non-distress situation, or
    - In a distress situation, which resolves, and you no longer require assistance;

Contact the nearest sar authorities via the most expedetious means available with the following information:

Beacon ID number (15 character UIN):

Position (at time of activation):

Date of Activation:

Time of Activation (Time zone):

Duration of Activation:

Beacon make and model:

Vessel Name/ID:

Circumstances/cause (if known):

PRIMARY U.S. POINT OF CONTACT IS THE U.S. COAST GUARD: PASS BY MOST EXPEDITIOUS, DIRECT MEANS TO

FOR THE PACIFIC:
Pacific area command center (510) 437 3700

FOR THE ATLANTIC/GULF OF MEXICO/ATLANTIC:
Atlantic area command center (757) 398-6390

OR FROM ANY LOCATION: (800) 323 SAFE
(800) 323 7233

The information in this book has been carefully checked and is believed to be accurate. However, no responsibility is assumed for inaccuracies.

CAUTION!

This equipment contains CMOS integrated circuits. Observe handling precautions to avoid static discharges which may damage these devices. Jotron AS reserves the right to make changes without further notice to any products or modules described herein to improve reliability, function or design. Jotron AS does not assume any liability arising out of the application or use of the described product.

WARNING / IMPORTANT

Jotron AS is a prime manufacturer of safety equipment designed for rescue of human lives and their property. For safety equipment to be effective in line with the design parameters it is important that they are handled, stowed and maintained in compliance with the manufacturers instructions. Jotron AS Cannot be held responsible for any damage caused due to incorrect use of the equipment or breach of laid down procedures or for failure of any specific component or other parts of the equipment.

Jotron AS does not take any responsibility for improper disassembling/ assembling of the equipment. We strongly recommend all service to be done by authorized Jotron agents. In addition to normal service, Jotron AS agents have the necessary equipment and education to test the operational functions of the beacon.

WARRANTY

All goods sold by Jotron AS are warranted to be free from defect in workmanship and material for the period of five (5) years from the date of delivery (unless stated otherwise and confirmed in writings).

PROVIDED:

(a) Jotron AS is given full particulars in writing of any claim prior to the expiration of such a period and within fourteen days of the dis covery of the alleged defect.

(b) The goods have stored, installed, maintained and used properly having regard in particular to Jotron AS specifications.

(c) Liability shall be limited at Jotron AS options to replacement or re pair or to a sum not exceeding the net invoice value of the defec tive goods.

(d) Upon request the alleged faulty goods are returned to Jotron AS at the Buyer's expense.

(e) Unless expressly stipulated in the acceptance of the order Jotron AS gives no warranty or guarantee of the fitness or suitability of the goods for any purpose whether disclosed or otherwise.

(f) All other warranties or conditions expressed or implied are hereby excluded and Jotron AS shall in no circumstances be liable for con sequential damages.

Abbreviations and definitions

BAUD
Transmission rate unit of measurement for binary coded data (bit per second).

BIT
Short form of Binary Digit. The smallest element of data in a binary-coded value.

BITE
Built in test equipment

BPS
Bits Per Second.

CHARACTER STRING
Continuous characters (other than spaces) in a message.

CHECKSUM
The value sent with a binary-coded message to be checked at the receiving end to verify the integrity of the message.

COSPAS
COsmicheskaya Sistyema Poiska Avariynich Sudov (Space System for the Search of Vessels in Distress)

CLOCK
A precisely spaced, stable train of pulses generated within an electronic system to synchronize the timing of digital operations within the system.

DEFAULT
The operator initiates a condition that the navigator assumes automatically if no other condition.

EPIRB
Emergency Position Indicating Radio Beacon

FRM
Final Recording Medium

GLOBAL POSITIONING SYSTEM (GPS)
The NAVSTAR Global Positioning System, which consists of orbiting satellites, a network of ground control stations, and user positioning and navigation equipment. The system has 24 satellites plus 3 active spare satellites in six orbital planes about 20,200 kilometers above the earth.

GPS
Global Position System

GPS SYSTEM TIME
Time corrected to Universal Time Coordinated (UTC) and used as the time standard by the user segment of the GPS system.

IEC
International Electro-technical Commission

IMO
International Maritime Organization

INTERFACE
Electronic circuits that permit the passage of data between different types of devices; For example, the speed and heading interface circuit permits data from a speed log and compass to pass to the navigator processor.

ITU
International Telecommunication Union

LED
Light Emitting Diode

LUT
Local User Terminal (Ground Station)

MCC
Mission Control Centre

PROCESSOR
The processor circuit card in the console that controls system operations and computes the positioning/navigation solutions.

RCC
Rescue Coordination Centre

SARSAT
Search and Rescue Satellite-Aided Tracking System

SBM
Shore Based Maintenance – as required by SOLAS regulation IV/15.9.2 of SOLAS 1974 as amended with, in accordance with MSC/Circ. 1039 guidelines for Shore-Based Maintenance (SBM) of Satellite EPIRBs within 5 years if:

Passenger ships (> 12 passengers) and cargo ships (> 300GT) engaged in International voyages, shall perform SBM as follows:

- Latest by the date of the EPIRB label with this text, or the battery Label, whichever is first.
- When this EPIRB becomes due for SBM in accordance with national requirements.

SOFTWARE
Values programmed and preloaded into memory. The values represent a permanent set of instructions for running the automatic functions (computations) of the navigator.

S-VDR
Simplified Voyage Data Recorder

VHF
Very High Frequency -A set of frequencies in the MHz region

VSWR
Voltage standing wave ratio

READY
TEST
COSPAS
GEBRAUCHSANWEISUNG
JAN 1
FEB 2
MAR 3
APR 4
MAY 5
JUN 6
JUL 7
CAPSULE
S-VDR SYSTEM :
SERIAL No :
HEX CODE, UIN :
NAME OF VESSEL :
MMSI CALL SIGN. :
OPEN

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1 GENERAL DESCRIPTION

The Main parts of the Capsule (Tron S-VDR CAPSULE) are the EPIRB (EPIRB module) and the S-VDR Server module. The Capsule is developed to meet the regulations and rules for use on ships, vessels and life rafts in the maritime service. The Capsule meets the following specifications for S-VDR and 406MHz EPIRB for use in search and rescue operations at sea:

- IEC 61996 ed.2
- IEC 61097-2 ed.3.0 (2008)
- IEC 60945 ed.4.0 (2002)
- C/S T.001 and C/S T007 (Nov. 2007)
- IMO MSC.163 (78)
- IMO A.810 (19)
- MED 96/98/EC

1.1 EPIRB MODULE

The Capsule is buoyant, and is designed to automatically release and to automatically activate the EPIRB in case of an emergency where the Capsule and its bracket is submerged into the sea. The EPIRB can also be manually operated. One mounting bracket is available to mount it as an automatic and manual EPIRB. The purpose of the EPIRB is to give a primary alarm to the search and rescue authorities. The EPIRB gives an immediate alarm when activated, transmitting the ID of the ship in distress. The EPIRB will at the same time transmit the position of the ship. Care must be taken not to activate the EPIRB unless in an emergency situation, in such cases the user will be held responsible. For periodic testing a test function is implemented. During the test cycle the EPIRB does a self-test off the transmitters and the battery status. No emergency signal is transmitted during the self-test. The battery of the EPIRB will last for at least 168 hours from activation.

1.1.1 SYSTEM DESCRIPTION

The COSPAS/SARSAT system was introduced in 1982 as a worldwide search and rescue system with the help of satellites covering the earth's surface. Since the introduction of the system more than 11200 persons have been rescued by the COSPAS/SARSAT system. Currently the system consists of 8 different satellites in a polar orbit Constellation. These satellites cover the entire earth's surface and receive the emergency signal from the 406MHz transmitter within the EPIRB. In addition several geostationary satellites are equipped with a 406MHz transponder. These satellites are not able to locate the Capsule but will give an early warning to the rescue forces, minimizing the time from an emergency oc-

curs till the rescue forces are at the site. Each emergency EPIRB in the system is programmed with its own unique code, therefore it is vital that the ships data that is given to the dealer you obtained your Tron S-VDR CAPSULE, is correct. If the EPIRB is programmed with serial protocol, it is important that the EPIRB is registered in the database for each country. This database is normally located in the same country that the ship is registered.

1.1.2 SIGNAL DETECTION

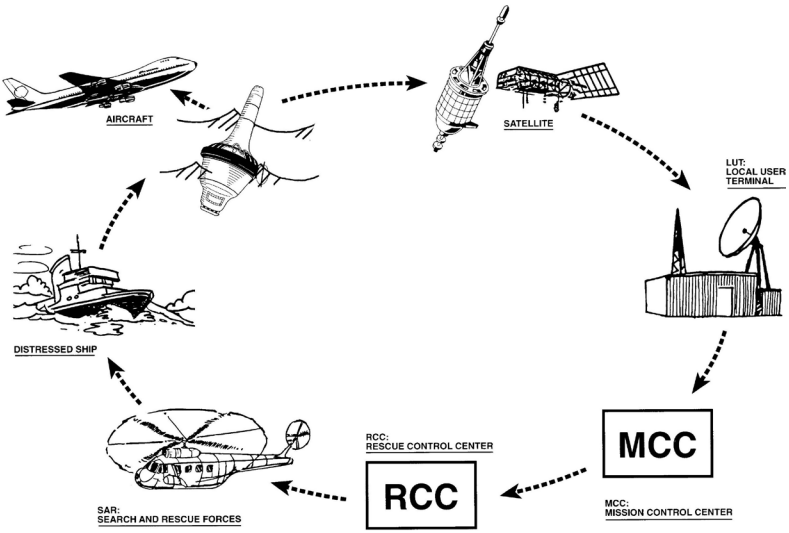
When the EPIRB is activated (manually or automatically) it transmits on the frequencies 121.5MHz and 406.028MHz.A homing signal is emitted on 121.5MHz and a burst is transmitted on 406.028MHz every 50 second after activation. This burst contains all necessary information about the ships in distress. After the EPIRB is activated, the next passing satellite will detect the transmitted signal and relay it to an antenna at a ground station, called a LUT (Local User Terminal). For the 121.5MHz signal the satellite must be within line of sight of both the EPIRB and a ground station.

The ground station or LUT has a 2500 km satellite reception radius centered at the LUT. In areas without LUT coverage (mostly less populated areas in the southern hemisphere), signals from the 121.5MHz transmitter will not be detected by the satellites, only by passing aircraft's. From the year 2006,no new satellites will be launched including 121.5MHz receiver, and from the year 2009,satellitedetection of the 121.5MHz EPIRB is terminated. This is not the case with the 406MHz transmitter, because the satellites have a memory unit, which stores the signals for relay to the next available LUT giving it a truly global coverage. Once the signal is received by the LUT, it is processed for location and sent to a Mission Control Center (MCC).The MCC sorts the alert data according to geographic search and rescue regions and distributes the information to the appropriate Rescue Co-ordination Center (RCC), or if outside the national search and rescue area, to the appropriate MCC that covers the area that the distress signal was detected. The RCC in turn takes the necessary action to initiate search and rescue activities.

1.1.3 DISTRESS LOCATION DETERMINATION

The location of the distress signal is determined by taking measurements of the doppler shift of the EPIRB frequency when the satellite first approach and then pass the EPIRB. The actual frequency is heard at the time of closest approach (TCA). Knowing the position of the satellite and using the received doppler signal information, it is possible to determine the location of the Capsule from the

satellite at the TCA. At the LUT, actually two positions are calculated. One is the actual position (A) and the other is the mirror image (B) position [FIG.1.1.3]. A second satellite pass confirms the correct location (A).With the 406MHzsystem the real solution can be determined on the first pass with a reliability of nearly 90% and down to an accuracy of less than 5 km (3.1 miles).



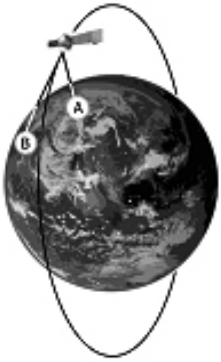


Figure 1.1.3 COSPAS/SARSAT Signal detection system

1.1.4 ADDED VALUE IN THE EPIRB

The EPIRB module has been designed to operate with the COSPAS-SARSAT system and will enhance further the lifesaving capabilities of conventional beacons. An integrated 12 channel GPS module accepts continuous positional information from the standard GPS system using 27 satellites providing an accuracy of approximately 100m.Upon activation of the Capsule in an emergency situation the positional information is incorporated into the distress message transmitted to LUT.

The main advantage with integrated GPS in the EPIRB is the rapid response and positional accuracy providing vital information during a rescue operation practically eliminating valuable time spent searching for the distressed. Whenever a distress message transmitted by the EPIRB is detected by a polar orbit satellite (LEOSAR) the delayed alert remains the same as for non-GPS integrated EPIRB`s (max.90 min.), but the position accuracy is improved considerably from a radius of 5 km. to amazing 100m.

Whenever a distress message transmitted by the EPIRB is detected by geostationary satellite (GEOSAR) the alert is immediate (max.5 min.), still providing the accurate position of 100m. Please note that the positional accuracy delay is depending on the actual protocol used and programmed into the EPIRB and the location of the emergency. The information is based on the capacity of the LEOSAR/GEOSAR COSPAS-SARSAT system.

1.1.5 EPIRB registration

Normally the MCC will contact the vessel or the contact person registered in a shipping register and/or an EPIRB register (Ships owner, family member etc.) before alerting the RCC. This is to determine if the alarm from the EPIRB for some reason is a false alarm, and an expensive rescue operation can be avoided.

Because of this it is important that the ships data is correct in the shipping register or in the EPIRB database. The Capsule purchased in some countries will have a registration form attached to it, it is important that this registration form is completed by the owner and returned to the place the Capsule was purchased or to the address specified on the registration form.

Other countries use the already available shipping register to obtain the necessary information for a vessel in distress, in these countries the ship is al-

ready registered and no registration form is necessary, however it is vital that the coding of the EPIRB is kept up to date with data on the ship (nationality, call.sign, etc.), to minimize the time from an alarm to the start of the search and rescue operation.

Reprogramming the EPIRB can be done at authorized Jotron AS agents in more than 250 different places throughout the world. If you are a resident of the United States, you must register this beacon with the National Oceanic and Atmospheric Administration (NOAA) using the registration card included with the unit. Fill out the form and send it to: SARSAT Beacon Registry, NOAA-SARSAT, E/SP3, FB4, Room 3320, 5200 Auth Road, Suitland, MD 20746-4304 Vessel owners shall advise NOAA in writing upon change of vessel or EPIRB ownership. Transfer of EPIRB to another vessel, or any other change in registration information, NOAA will provide registrants with proof of registration and change of registration postcards.

1.2 S-VDR SERVER MODULE

The S-VDR Server module consists of S-VDR Server module house including Flashdisc. The S-VDR Server module is DC powered from the ship via the bracket connector. The S-VDR data is fed from the ships S-VDR system to the S-VDR Server module through the same connector. When the Capsule leaves the automatic release bracket, all electrically power and data connections between the ship S-VDR system and the S-VDR Server module inside the capsule is broken.

2 TECHNICAL SPECIFICATIONS

STANDARDS	IEC 61097-2 ed.2 annex D and EN 60945 ed.4 2002-08
ENVIRONMENTAL	
Temperature range	-20°C to +55°C (operating) -40°C to +70°C (storage)
Degree of protection	10 m depth at 5min
GENERAL	
External Supply voltage for module	12 – 30 VDC
Current consumption	
S-VDR	0.25 A at 24VDC
Locator lights	Flashing Xenon light
Test light	Test LED
Frequency range	406,028 / 121,5MHz
Programming	IR port, 2400 bit/s.
Operating life EPIRB	168 hours at -20°C
Dimension	L = 570 mm Ø = 188 mm.
Weight	Approx. 3.5 kg
Material housing	Polycarbonate with 10% glass fiber.
Antennas 406.028MHz, 121.5MHz	Built in, vertical polarization, omnidir.
Antenna GPS	Built in GPS patch antenna.
406MHz TRANSMITTER	
Frequency	406.028MHz +2kHz / -5kHz
Output Power	5W ± 2dB
Protocols	MMSI Standard Location (long) Serial EPIRB Standard (long)
Modulation	Phase modulation 1.1 ±0.1rad.
Data Encoding	Bi Phase L.
Stability	Short term: ≤ 2*10-9. Medium term: ≤ 2*10-9. Residual noise: ≤ 3*10-9.
Bit rate	400 b/s

121,5MHz TRANSMITTER

Frequency	121.500MHz ± 10ppm.
Output Power	>75mW
Modulation	A9 AM. The modulation starts with a letter V for VDR in Morse code, then a sweep tone from max 1600Hz to min 300Hz is transmitted. Sweep range >700Hz, Downward / Upward Sweep rate 2-3 Hz.

S-VDR MODULE

Flash disk	2GB, 1.7GB free or 4 GB, 3.7 GB free.
Interface	Ethernet 10BaseT (10Mbit)
Cable length	< 100 m

GPS RECEIVER

Type	Navman Jupiter, 12 channel GPS receiver
Channels.	12 channels
Accuracy	Better than 4 sec. of an arc.
Frequency	1575.42 MHz

MOUNTING BRACKET

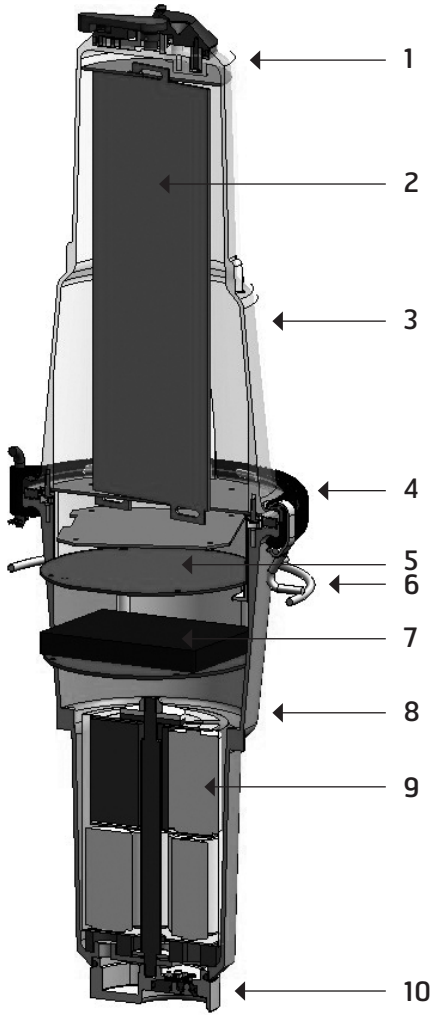
Dimensions:	Height: 695 mm, Width: 166 mm, Depth: 112mm
Weight:	4.6 Kg
Hydrostatic release	Hammar H20
Material	Stainless Steel AISI 316 (SIS 2343)

BATTERY MODULE 8 PCs SAFT LSH20 Lithium-Thionyl chloride (Li-SOCL2). Connected in series and parallel. Fuse in each cell.

3 FUNCTIONAL DESCRIPTION

3.1 GENERAL

The Tron S-VDR Capsule consists of ten parts.



1. Main EPIRB switch
2. Antenna board
3. Upper housing
4. Equator ring with gasket
5. EPIRB module
6. Recovery ring with mounting clips
7. S-VDR Server module
8. Lower housing
9. Battery module
10. S-VDR Connector

Figure 3.1, Cut-through S-VDR Capsule

3.1.1 CAPSULE HOUSING

The capsule module consists of upper and lower house mounted together with an equator ring with gasket and locking pin.

3.1.2 S-VDR SERVER MODULE

The S-VDR Server module consists of S-VDR Server module house including Flash disc and a double-sided PCB board with power regulator and PC circuits. The S-VDR Server module is DC powered from the ship via the bracket connector. The S-VDR data is fed from the ships S-VDR system to the S-VDR Server module through the same connector. When the capsule leaves the automatic release bracket, all electrically power and data connections between the ship S-VDR system and the S-VDR Server module inside the capsule is broken.

3.1.3 EPIRB MODULE

The EPIRB module consists of four printed circuit boards, which are mounted in the upper housing:

1. The main board w/GPS patch antenna, Xenon flash and an indicator LED
2. Antenna board. (121.5 / 406 MHz)
3. GPS interface board
4. GPS receiver

For automatic activation of the EPIRB module, put the capsule in the upright position into the water, and the transmission starts when the seawater completes the circuit between the two external electrodes (sea water contacts).
When the capsule is mounted in the automatic release bracket mechanism, there is a safety switch in the EPIRB module, a reed contact activated by a magnet at the FBR-3 bracket, which disables the seawater contacts. See figure 3.1.5.
If submerged in water, the hydrostatic release mechanism will release the capsule at a depth of 2-4 meters. The transmission will start when the circuit between the seawater contacts is closed and the capsule is out of the bracket. The EPIRB module may be manually activated with the main switch, and is then independent of seawater contacts. The EPIRB module will also operate while placed in the bracket when manually activated.

The capsule may easily be released from the mounting bracket manually.

3.1.4 BATTERY MODULE

The Battery module is feeding the EPIRB module with 7.2VDC power to keep the EPIRB transmitters active for 168 hours when activated, and for test sequences. The battery module consists of eight SAFT LSH20 Lithium-Thionyl chloride (Li-SOCL2) batteries connected in series and parallel and is attached inside the lower house.

3.1.5 AUTOMATIC RELEASE BRACKET, FBR-3

The FBR-3 bracket is the docking station for the capsule. A connector and a cable connected to the ships 24VDC power and S-VDR data keeps the S-VDR Server module alive and working when the capsule is in the bracket.

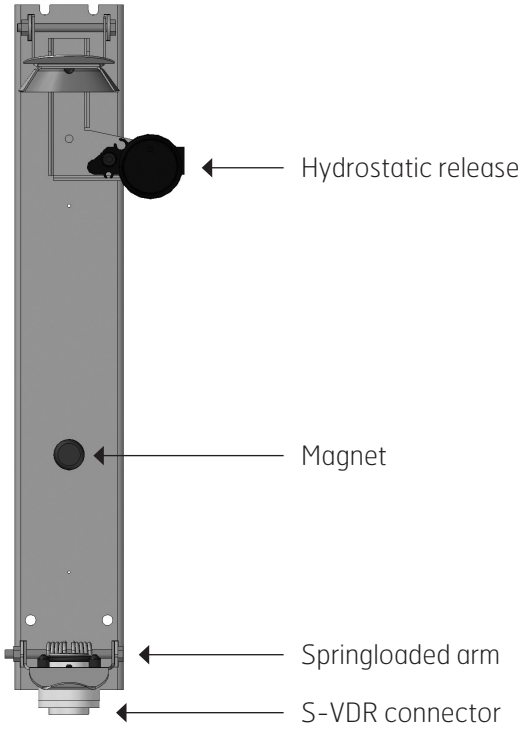


Figure 3.1.5, FBR-3 bracket

3.1.6 S-VDR Data and Power connections

3.1.6.1 S-VDR Data and Power connector, capsule

Figure 3.1.6.1, S-VDR female connector in capsule.

3.1.6.2 S-VDR DATA AND POWER CONNECTOR, BRACKET

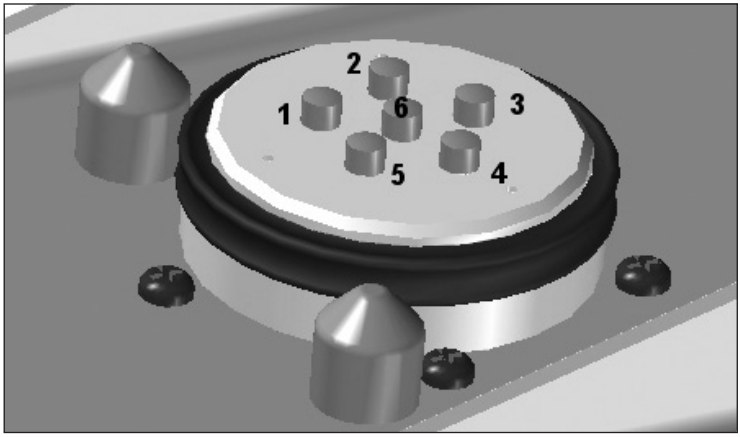


Figure 3.1.6.2, S-VDR male connector in bracket.

3.1.7 WIRING TABLE S-VDR DATA AND POWER CONNECTION

Pin nr	Wire color bracket and connection box	Wire color inside capsule	Function
1	Blue	White	Ethernet Tx +
2	Green	Red	Ethernet Tx -
3	Brown	Green	Ethernet Rx +
4	Yellow	Brown	Ethernet Rx -
5	Pink	Yellow	+ Supply
6	Grey	Black	GND

4 INSTALLATION

4.1 MOUNTING BRACKET FBR-3

The bracket is an automatic release bracket. Not all details are shown at this picture.

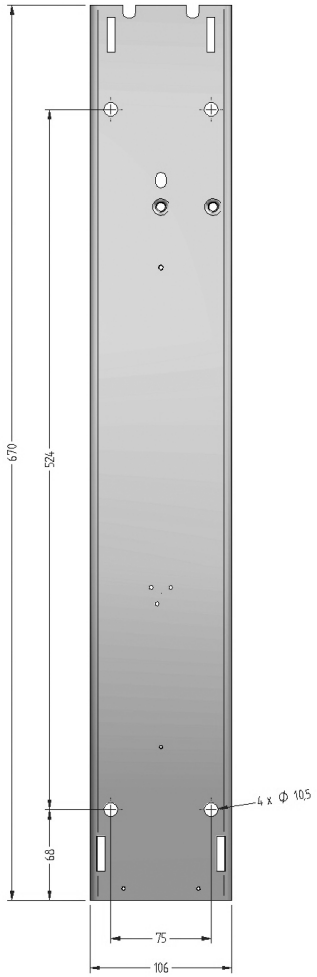


Figure 4.1, Part of FBR-3 bracket with measures

4.2 MOUNTING THE FBR-3

Bolt the unit to the vessel using the mounting holes. The Float Free Bracket FBR-3 must be connected to the fixed installation S-VDR installation through the junction box according to the connection diagram in paragraph 3.1.7.
When the Capsule is mounted in the FBR-3 release mechanism, it operates as a float free automatic unit.

Therefore it is important that the bracket is mounted in a place where there are no obstructions that can endanger the automatic release of the beacon.
The location where the bracket is mounted should be as high as possible on the vessel, protected from environmental conditions such as direct sea spray, chemicals, oil, exhaust and vibrations. The location must also be easily accessible for testing and maintenance.

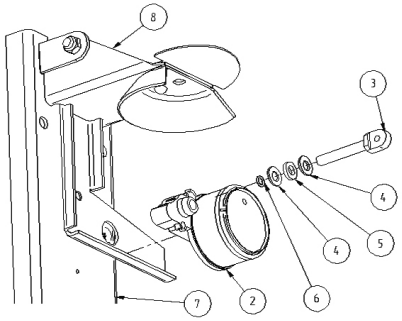
4.3 MOUNTING OF THE CAPSULE INTO THE FBR-3

Strain the spring loaded lower arm with the connector at the lower part of the bracket. Place the higher part of the Capsule into the top grip of the bracket with the main switch facing out. Then push the Capsule into the bracket and slowly release the lower arm, checking that the connector pins at the bracket hits the connector holes at the Capsule. Place the locking bolt into the corresponding holes in the lower arm, and mount the clamp at the bolt.

4.4 REPLACEMENT AND MOUNTING OF THE HYDROSTATIC RELEASE MECHANISM

The Hydrostatic Release Mechanism must be mounted before the Capsule is placed into the FBR-3 bracket. To replace the Hydrostatic Release Mechanism, remove the Capsule from the bracket:

1. Remove the clamp on the locking bolt on the spring-loaded lower arm.
2. Remove the locking bolt.
3. Whilst holding the Capsule, strain the spring-loaded lower arm and gently remove the Capsule from the bracket.
4. Now the H20 unit is accessible. Unscrew the plastic bolt (3) and remove the unit.
5. Replace the old unit with a new one and tag in expiration date for 2 more years.
6. Screw the new plastic bolt on. Make sure the distance piece (4,5,6) is in place on the plastic bolt. Tighten the bolt using hand-force only until rubber seal (5) starts to compress. Replace the Capsule into the bracket, reversing paragraph 1, 2 and 3.



Item Number	Document Number	Title	Quantity
2	M-94232	HYDROSTATIC RELEASE UNIT, HAMMAR H20	1
3	M-92243	HYDROSTAT H20 BOLT	1
4	M-91362	WASHER, DIN125 M8	2
5	M-95054	WASHER EPDM 108 OD14,5 T3	1
6	M-95135	O-RING 6x1,5 NBR 70 share A	1
7	M-82337	BACK PLATE FBR-3 BRACKET	1
8		HINGE ASSY	1

4.5 JUNCTION BOX

The junction box is connected to the connector on the FBR-3 bracket with a special cable.

All connections to the ships systems are done at the Junction box. See figure 4.5.a.

The two fuses are for protection of + DC supply and Ground.
The fuses act as short circuit protection and will automatically reset some minutes after the short circuit is removed.

Ingress protection of Junction box included bushing nipples: IP66

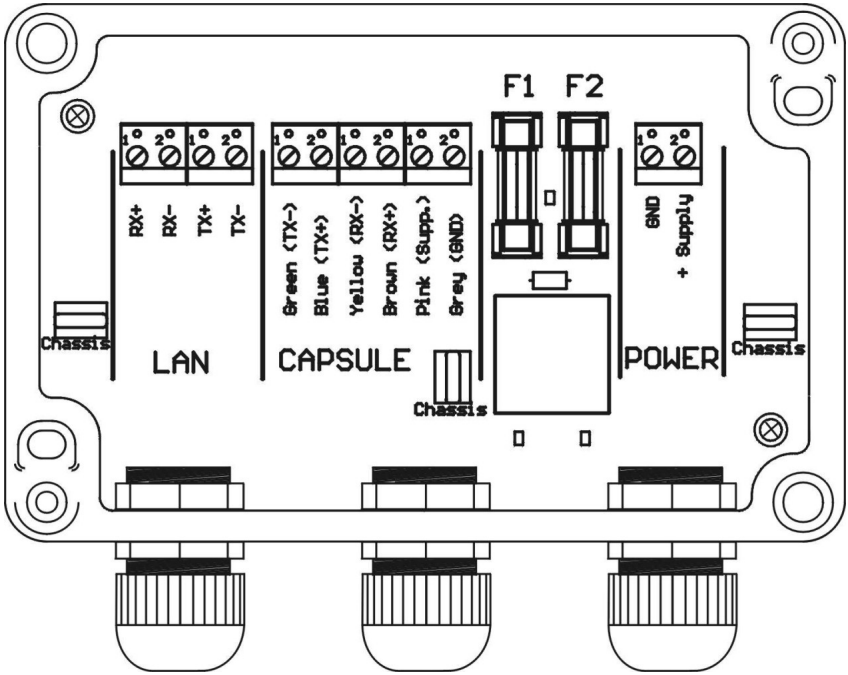


Figure 4.5.a, Junction box with lid removed

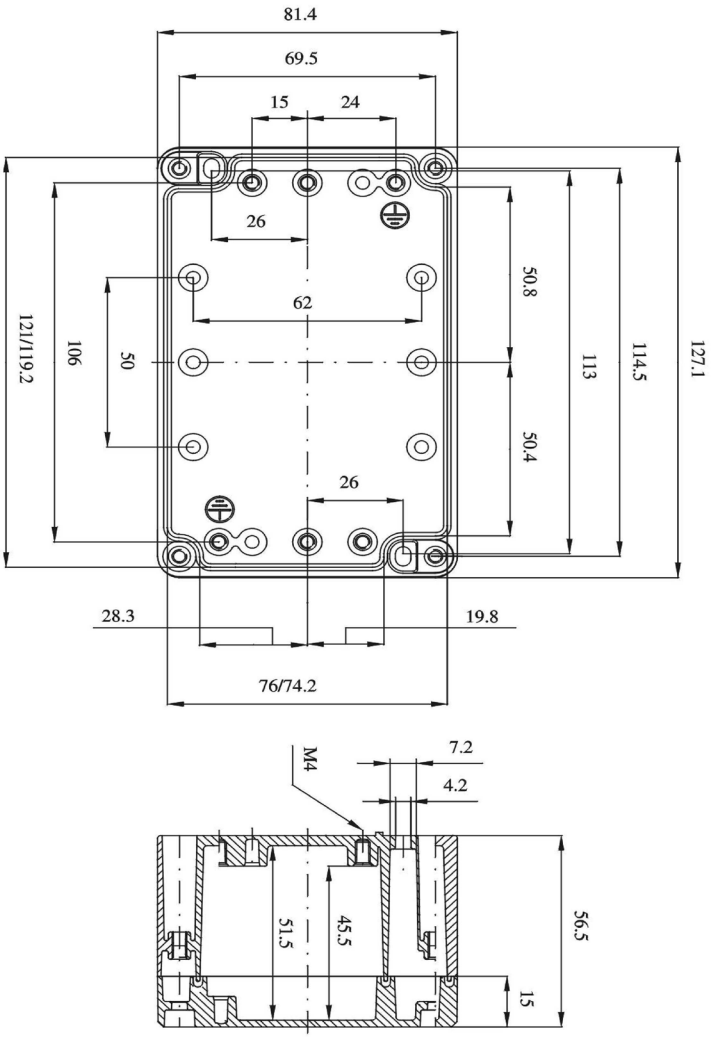


Figure 4.5.b, Junction box with measures

S-VDR CAPSULE
DO NOT OPEN
UP
S-VDR CAPSULE
JOTRON

5 OPERATING INSTRUCTIONS

5.1 FBR-3 FLOAT FREE BRACKET

When the capsule is mounted in the FBR-3 bracket release mechanism, it operates as a float free automatic unit.

5.2 MANUAL OPERATION OF EPIRB MODULE

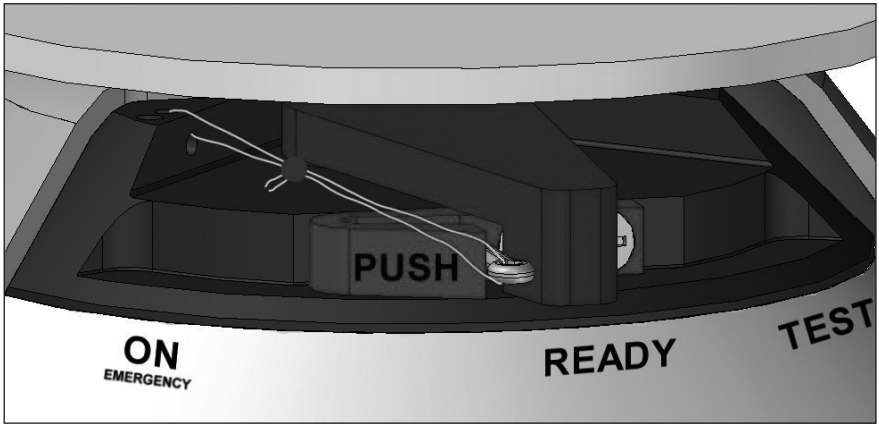


Figure 5.2, EPIRB Main switch

The manual operation can be done when the capsule is mounted in the bracket or when the capsule is removed from the bracket.
Break the seal on the main switch and pull the locking pin. Push in the leftmost part of switch mechanism and the switch will automatically go to the ON (Emergency) position.

The red indicator lamp and the Xenon flash on the main board will start operating, indicating that the EPIRB module is active.

NOTE!
The EPIRB module performs a complete self-test before any emergency signals are transmitted. The Transmitters will start after approx. 70 seconds. At the same time GPS receiver is started. This is done to prevent the GPS receiver to start in TEST position. Turning the switch back to the READY position stops the transmission. If the Capsule is out of the bracket, make sure the battery compartment is dry to prevent activation of the seawater contacts.

5.3 AUTOMATIC OPERATION OF EPIRB MODULE

When the capsule is removed from the release mechanism and placed into water it will automatically activate due to the seawater contacts. Transmission will stop when the capsule is lifted out of the water, and if necessary dried off.

When placed in the automatic release mechanism the seawater contacts are disabled. When the mechanism is reaching a depth of 2-4 meters, the capsule will be released and transmission will start automatically.

NOTE!
There is a time delay of approx. 10 seconds of activation/deactivation with the seawater contact.

5.4 TESTING THE EPIRB MODULE

IMPORTANT:
The self-test should be performed only within the first 5 minutes of any hour.

To perform the self-test, the Capsule has to be removed from the bracket.

WARNING

Releasing the Capsule from the bracket will interrupt all connections between the ships S-VDR system and the FRM inside the Capsule, and all recordings will be interrupted. The regulations require the Capsule not to be removed for more than 10 minutes.

1. Press the spring-loaded switch on top of the Capsule to the TEST position, see paragraph 5.2. Keep hands and other objects away from the upper part of the Capsule. (Away from the antenna).

2. A successful test will consist of a series of blinks on the LED test-indicator, followed by a continuous light and a strobe flash after app.15 seconds.

3. If the procedure fails to end up with a continuous light, this indicates a fault in the EPIRB module. (See paragraph 6.2.1).

4. Release the switch and put the Capsule back into the bracket.

What the self-test actually does is first to wait app.15 seconds to allow the reference oscillator inside the EPIRB module to warm up. Then a short burst is transmitted by the 121.5MHz transmitter, while the output level of the transmitter is checked. Finally, a test signal is transmitted by the 406 transmitter. During this test signal the battery voltage, output power and frequency is checked. While testing the 406 MHz transmitter a test message is transmitted. This test message is coded with a special synchronization code and will not be detected by the COSPAS/SARSAT satellites. The purpose of this test message is to control the actual coding of the EPIRB module. This can be done with the Jotron AS test unit Tron UNIDEC or another EPIRB tester.

5.5 OPERATION OF THE S-VDR MODULE

5.5.1 OPERATING SOFTWARE

The software operating system of the S-VDR module is Linux. The system includes SAMBA, which enables other software platforms to access Linux file system, and a FTP (File Transfer Platform) server.

For more detailed information, see the Technical manual.

5.6 CHANGE OF BATTERY

5.6.1 MSC CIRC. 1039

If the S-VDR Capsule is the main EPIRB on board the ship, the rules of MSC CIRC 1039 apply, and the battery must be changed at an authorized workshop.

If the S-VDR Capsule is the second EPIRB on board the ship, authorized personnel can change the battery on board.

To change the battery, the lower Capsule Assembly is replaced with a new one.

1. Remove the clips and the recovery ring around the equator ring.
2. Remove split pin and pull the U-shaped bolt from the equator ring.
3. Remove the equator belt by pressing it out from the housing.
4. Separate the lower and upper part of the capsule assembly.
5. Unplug the battery connector, the S-VDR connector and the seawater connector.

6. Check that the new battery is marked with date of expiration.
7. Place the new gasket on the battery housing.
8. Connect the battery connector, the S-VDR connector and the seawater connector.
9. Replace the upper part, taking care that the gasket is correctly fitted and taking note of the orientation marks on the two housings.
10. Replace the equator ring, U-shaped bolt and split pin.
11. Replace the clips and the recovery ring around the equator ring.
12. Perform a Self-test.

5.6.2 BATTERY DISPOSAL

Dispose in accordance with applicable regulations, which vary from country to country.(In most countries, the thrashing of used batteries is forbidden and the end-users are invited to dispose them properly, eventually through non-profit organizations, mandated by local governments or organized on a voluntary basis by professionals).Lithium batteries should have their terminals insulated prior to disposal.

5.6.2.1 INCINERATION

Incineration should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment.

5.6.2.2 LAND FILLING

Leachability regulations (mg/l)

Component	Leachability	EC limit	EPA	Other*
Iron	100			5
Nickel	100	500	2	0,5

* applicable to France

5.6.2.3 RECYCLING

Send to authorized recycling facilities, eventually through licensed waste carrier.

6 MAINTENANCE AND TROUBLESHOOTING

6.1 EPIRB MODULE / BATTERY MODULE

The EPIRB should be tested and batteries replaced according to MSC circ.1039. See chapter 5.6.1.

6.2 TESTING EPIRB MODULE

IMPORTANT:

The self-test should be performed only within the first 5 minutes of any hour.

6.2.1 SELF-TEST WITH SEA WATER CONTACTS ACTIVATED

To perform the self-test with seawater contacts activated, the capsule has to be removed from the release mechanism. Authorized personnel should annually test the seawater contacts.

WARNING

Releasing the Capsule from the bracket will interrupt all connections between the ships S-VDR system and the FRM inside the Capsule, and all recordings will be interrupted. The regulations require the Capsule not to be removed for more than 10 minutes.

Remove the capsule from the release mechanism and go to paragraph 6.2.2.

6.2.2 SELF-TEST WITH SEA WATER CONTACTS DEACTIVATED

Turn the switch to the «TEST» position. The red indicator will start flashing for approx. 15 sec. This is to allow the internal TCXO (Temperature Controlled Xtal Oscillator) to be stable. Then the output power of both transmitters are checked, the battery voltage and the PLL of the 406 Transmitter. A complete message on the 406 Frequency is transmitted, with inverted frame sync.

If all tests are passed there will be one flash in the Xenon bulb, and the red indicator light will turn on and stay on until the switch is released.

A successful test will then consist of a series of rapid flashes in the test indicator, followed by one Xenon flash and continuous light in the test indicator.

Any other behavior indicates a fault in the EPIRB module.

6.3 MAINTENANCE OF EPIRB

WARNING

Releasing the Capsule from the bracket will interrupt all connections between the ships S-VDR system and the FRM inside the Capsule, and all recordings will be interrupted. The regulations require the Capsule not to be removed for more than 10 minutes.

Every Month:
Perform EPIRB self-test. (See chapter 6.2.1).
What the self-test actually does is to send out a short test signal on 121,5 and 406,028Mhz,testing the output of the transmitter. While transmitting the test signal, the battery voltage, output power and phase lock is tested. During the test of the 406Mhz transmitter a test message is transmitted, this test message is coded with a special synchronization code and will not be recognized as real alert by the COSPAS/SARSAT satellites. Carry out visual inspection for defects on both the Capsule and Bracket.

The Capsule should be easily removed and replaced in the Bracket. Make sure that the Capsule and Bracket is not painted or otherwise covered with chemicals, oil, etc. Check the expiry date of the

EPIRB Battery and the Hydrostatic Release Mechanism. Check the presence of a firmly attached lanyard in good condition and that it is neatly stowed and is not tied to the vessel or the mounting bracket. If the Tron S-VDR CAPSULE is the main EPIRB on board, these rules must be followed: Every 12th Month: Perform extended annual test according to IMO's MSC/Circ.1040 (Annual testing of 406 MHz satellite EPIRBs) as required by SOLAS IV/15.9.This test can be carried out by one of Jotron AS authorized representatives or any other service provider in possession of a Tron UNIDEC, Tron DEC or any other Cospas/Sarsat EPIRB tester/decoder.

The test ensures that the EPIRB is within its specifications and complies with IMO and the COSPAS/SARSAT system. Documented proof of test or Test Cer-

tificate containing test results and EPIRB data issued by service provider must be kept onboard for future inspections the next 12 months.

Every 2nd Year:
Hydrostatic Release Mechanism including Plastic Bolt on the Float Free Brackets must be replaced.(Check expiry date on label).

Every 5th Year:
The EPIRB Battery must be replaced every 5th year, unless otherwise instructed by the vessel flag state or local authorities.(Check expiry date on label).

6.3.1 EPIRB MODULE ERROR MESSAGES

If the self-test detects a fault in the EPIRB module one or more of the following indications are shown:

1. Flashing LED for 15 sec. followed by one (1) flash, no Xenon flash:
Error: Low power on 406 MHz transmitter

2. Flashing LED for 15 sec. followed by two (2) flashes, no Xenon flash:
Error: Low battery voltage

3. Flashing LED for 15 sec. followed by three (3) flashes, no Xenon flash:
Error: Low power on 121.5 MHz transmitter

4. Flashing LED for 15 sec. followed by four- (4) flash, no Xenon flash:
Error: PLL on 406 Transmitter out of lock

5. Five (5) flashes, no Xenon flash:
Error: EPIRB module not programmed or programming not complete

6.4 TEST OF GPS RECEIVER WITHOUT TRANSMITTERS ACTIVATED

This information is restricted and is included in the Technical manual only.

6.5 S-VDR MODULE

In accordance with SOLAS Chapter V Regulation 18.8; -the S-VDR shall be subject to an annual performance checks. A ship required under International rules to carry a functioning simplified voyage data recorder (S-VDR), and under Paris Memorandum Port State Control requirements a ship may be detained if the S-VDR is not functioning properly.

The person carrying out the annual checks should be approved by the ship's Flag Administration and show evidence that he has been authorized by the S-VDR manufacturer to service the particular make and model of equipment. To act in accordance with the requirements for bit-error-rate monitoring the status of the Tron S-VDR flash disk memory is to be checked during the annual survey to be specified by the S-VDR manufacturers procedures.

7 SERVICE AGENTS

Please look at www.jotron.com for Marine Service Agents.

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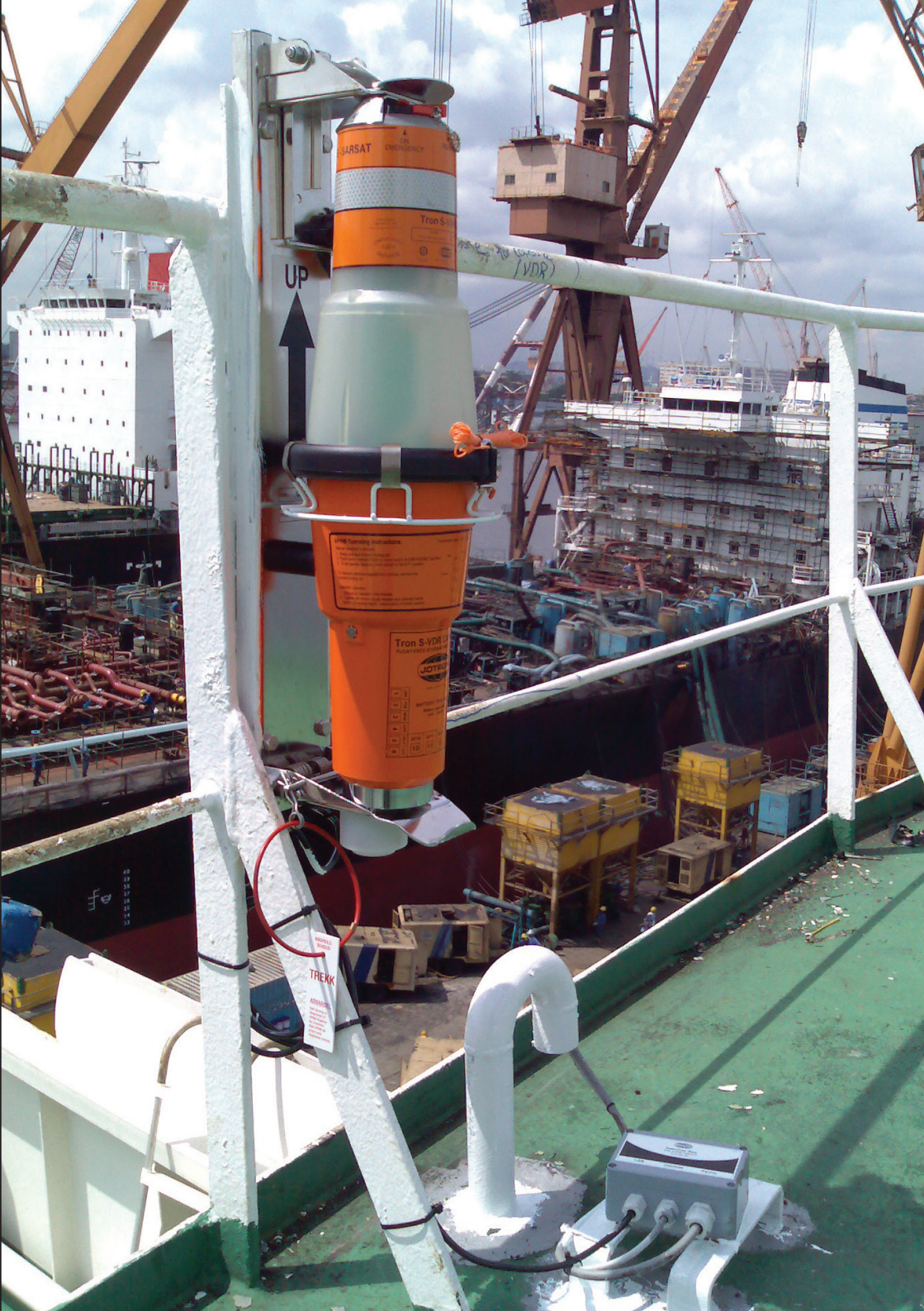
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